

What is claimed is:

1. A vertical cavity surface emitting laser (VCSEL), comprising:
5 at least one quantum well having a depth of at least 40 meV and
comprised of GaAsSb;
barrier layers sandwiching said at least one quantum well; and
confinement layers sandwiching said barrier layers.

10 2. The VCSEL of claim 1 wherein said barrier layers are comprised of
GaAsP.

3. The VCSEL of claim 2 wherein said confinement layers are comprised
of AlGaAs.

15 4. The VCSEL of claim 1 wherein said confinement layers are comprised
of AlGaAs.

20 5. The VCSEL of claim 4 wherein said barrier layers are comprised of
AlGaAs.

6. The VCSEL of claim 1 wherein said barrier layers are comprised of
AlGaAs.

25 7. The VCSEL of claim 1 wherein said at least one quantum well
comprises N.

8. The VCSEL of claim 7 wherein said barrier layers are comprised of
GaAsP.

9. The VCSEL of claim 7 wherein said confinement layers are comprised of AlGaAs.

10. The VCSEL of claim 8 wherein said confinement layers are
5 comprised of AlGaAs.

11. The VCSEL of claim 9 wherein said barrier layers are comprised of AlGaAs.

10 12. The VCSEL of claim 7 wherein said barrier layers are comprised of AlGaAs.

13. The VCSEL of claim 1 wherein said at least one quantum well
comprises >1% N added to the quantum well(s).

15 14. The VCSEL of claim 13 wherein said barrier layers are comprised of GaAsP.

20 15. The VCSEL of claim 13 wherein said confinement layers are comprised of AlGaAs.

16. The VCSEL of claim 14 wherein said confinement layers are comprised of AlGaAs.

25 17. The VCSEL of claim 15 wherein said barrier layers are comprised of AlGaAs.

18. The VCSEL of claim 13 wherein said barrier layers are comprised of AlGaAs.

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19. The VCSEL of claim 1 wherein said quantum well is up to and including 50 Å in thickness.

20. The VCSEL of claim 19 wherein said barrier layers are comprised of GaAsP.

21. The VCSEL of claim 20 wherein said confinement layers are comprised of AlGaAs.

22. The VCSEL of claim 19 wherein said confinement layers are comprised of AlGaAs.

23. The VCSEL of claim 22 wherein said barrier layers are comprised of AlGaAs.

24. The VCSEL of claim 19 wherein said barrier layers are comprised of AlGaAs.

25. The VCSEL of claim 19 wherein said at least one quantum well comprises N.

26. The VCSEL of claim 25 wherein said barrier layers are comprised of GaAsP.

27. The VCSEL of claim 25 wherein said confinement layers are comprised of AlGaAs.

28. The VCSEL of claim 6 wherein said confinement layers are comprised of AlGaAs.

29. The VCSEL of claim 27 wherein said barrier layers are comprised of AlGaAs.

5 30. The VCSEL of claim 25 wherein said barrier layers are comprised of AlGaAs.

31. The VCSEL of claim 19 wherein said at least one quantum well comprises >1% N added to the quantum well(s).

10 32. The VCSEL of claim 31 wherein said barrier layers are comprised of GaAsP.

33. The VCSEL of claim 31 wherein said confinement layers are comprised of AlGaAs.

15 34. The VCSEL of claim 32 wherein said confinement layers are comprised of AlGaAs.

20 35. The VCSEL of claim 33 wherein said barrier layers are comprised of AlGaAs.

36. The VCSEL of claim 31 wherein said barrier layers are comprised of AlGaAs.

25 37. A vertical cavity surface emitting laser (VCSEL), comprising:
at least one quantum well having a depth of at least 40 meV and comprised of GaAsSbN;
barrier layers sandwiching said at least one quantum well; and
confinement layers sandwiching said barrier layers.

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38. The VCSEL of claim 37 wherein said barrier layers are comprised of GaAsP.

5 39. The VCSEL of claim 20 wherein said confinement layers are comprised of AlGaAs.

40. The VCSEL of claim 19 wherein said confinement layers are comprised of AlGaAs.

10 41. The VCSEL of claim 22 wherein said barrier layers are comprised of AlGaAs.

42. The VCSEL of claim 19 wherein said barrier layers are comprised of AlGaAs.

15 43. The VCSEL of claim 19 wherein said at least one quantum well further comprises >1% N added to the quantum well(s).

20 44. The VCSEL of claim 25 wherein said barrier layers are comprised of GaAsP.

45. The VCSEL of claim 25 wherein said confinement layers are comprised of AlGaAs.

25 46. The VCSEL of claim 26 wherein said confinement layers are comprised of AlGaAs.

47. The VCSEL of claim 7 wherein said quantum well is up to and including 50 Å in thickness.

30 48. A vertical cavity surface emitting laser (VCSEL), comprising:

at least one quantum well having a depth of at least 40 meV and comprised of GaAsSbN;

barrier layers sandwiching said at least one quantum well; and

AlGaAs confinement layers sandwiching said barrier layers.

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49. The VCSEL of claim 48 wherein said barrier layers are comprised of GaAsP.

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50. The VCSEL of claim 48 wherein said barrier layers are comprised of AlGaAs.

51. The VCSEL of claim 48 wherein said at least one quantum well further comprises >1% N added to the quantum well(s).

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52. The VCSEL of claim 51 wherein said barrier layers are comprised of GaAsP.

53. The VCSEL of claim 51 wherein said barrier layers are comprised of AlGaAs.

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54. The VCSEL of claim 48 wherein said quantum well is up to and including 50 Å in thickness.

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55. The VCSEL of claim 54 wherein said barrier layers are comprised of GaAsP.

56. The VCSEL of claim 54 wherein said barrier layers are comprised of AlGaAs.

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57. The VCSEL of claim 54 wherein said at least one quantum well further comprises >1% N added to the quantum well(s).

58. The VCSEL of claim 57 wherein said barrier layers are comprised of GaAsP.

5 59. The VCSEL of claim 57 wherein said barrier layers are comprised of AlGaAs.

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